



wherein:

M is a cation of a metal selected from the group consisting of Fe, Mn, Co, Ti, Ni or mixtures thereof;

D is a metal having a +2 oxidation state selected from the group consisting of Mg^{2+} , Ni^{2+} , Co^{2+} , Zn^{2+} , Cu^{2+} , and Ti^{2+} ;

T is a metal having a +3 oxidation state selected from the group consisting of Al^{3+} , Ti^{3+} , Cr^{3+} , Fe^{3+} , Mn^{3+} , Ga^{3+} , Zn^{3+} , and V^{3+} ;

Q is a metal having a +4 oxidation state selected from the group consisting of Ti^{4+} , Ge^{4+} , Sn^{4+} , and V^{4+} ;

R is a metal having a +5 oxidation state selected from the group consisting of V^{5+} , Nb^{5+} , and Ta^{5+} ;

X comprises Si, S, P, V or mixtures thereof;

0 ≤ x ≤ 1; and

0 ≤ d, t, q, r ≤ 1, where at least one of d, t, q, and r is not 0.